Original Article

Effective Online Academic Innovation to Continue Academic Flow During Challenging Situation: Views of the Students

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Abstract

Introduction: *Continuing the teaching and learning of Anatomy is challenging in a situation where the students are not available in the classroom. This is more in Anatomy because of peculiarity of nature of its curriculum and requirements of teaching aids.*

Objective: *This study was designed to identify the better way of continuing education of Anatomy online in special situation where students were detached from one institute for a shorter period (about 2 months) of time.*

Method: *The study was conducted on a group of second year MBBS course students who went on leave unexpectedly. The Anatomy department of the studied institution maintains contact using mobile application (App). The department prepared recorded classes on PowerPoint slides, uploaded those at a YouTube channel and links were shared with the students as per the course schedule throughout the period students remained on leave. Views of the students were collected on self-administered questionnaire when they returned back to the organization. Data were both quantitative and qualitative in nature.*

Result: *Total 86 (68.25%) students out of 126 voluntarily participated in the study of which 1 response was rejected, 47 (55.3%) were Bangladeshi students and rest were foreign students. All Bangladeshi students viewed that recorded classes of Anatomy department, PDF of Anatomy department, YouTube lectures and online anatomical images were useful. Live classes on Zoom were identified as wastage of time or not tried by 13.3% Bangladeshi students. All foreign students viewed that recorded classes of Anatomy department were useful and live classes on Zoom were identified as wastage of time or not tried by 10.5% of them. Almost all (92%) Bangladeshi students opined that recorded classes translated in Bangla were very useful.*

Conclusion: *This study revealed that online strategy can be an adjuvant to the main strategy of Anatomy teaching and learning as well as language barrier of the students need to be addressed.*

Keywords: *Continuing Anatomy teaching, Challenging situation, Online class.*

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Introduction

The optimal way of teaching future generation is a subject of debate amongst the educators. Various disciplines are advancing in their ways to have undergraduate students, resulting in competitive overloading of the course contents by the educators. Recently students are facing accumulation of contents because of their abstinence from college due to special unavoidable situations. Modern medical curriculums are designed to foster learner engagement and to encourage active participation and to promote life-long learning. But, simultaneously the curriculum is failing to reduce the pressure of contents and time in undergraduate course. Falling behind in reading schedule and high workload are identified as the major stress factors of undergraduate medical students of Bangladesh[1].

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In undergraduate course, Anatomy teaching is mostly practical and demonstration based. Of the total 527 hours, 115 hours are allocated for lectures and rest 412 hours for practical and demonstration (78.18%)[2]. The formative assessment is multiple small part completion examination and feedback based (Item examination). The universities maintain a fixed period to complete the course and arrange summative examination[3]. Departmental academic calendar doesn't get enough buffer time to adjust unexpected loss of course time due to unavoidable absence of students at the college.

Major factors identified through research as contributing to anxiety and falling behind are excessive course load, lack of time to revise before examinations and lack of systematic studies, high parental expectations and lack of time for physical activity and extracurricular activities[4]. Study shows that availability of the bone or viscera during studying books assists learning gross Anatomy which need the students at the classroom[5].

Continuing the teaching and learning of Anatomy is challenging in a situation where the students are not available in the classrooms. This is more in Anatomy because of the peculiarity of nature of its curriculum and requirements of teaching aids. One of the most important aspects of anatomical education is the opportunity for medical students to learn from cadavers. In recent days because of the scarcity of cadaver, educators are increasingly adopting digital methods in the field of Anatomy. The implementation of multiple teaching strategies has the capacity to adapt to different learning preferences and enhance the understanding of Anatomical concepts[6]. Some medical colleges are offering supplementary online resources from external sources to augment the conventional modes of delivering lectures and other course works to students[7]. In Anatomy teaching-learning process, online learning is often used as an addition to the dissection of human cadavers but rarely as a replacement. The effectivity is also contextual. Acceptance by the students and availability of the supports are important determinants of the success of these efforts. At present, wide range of learning materials is available on open access websites. Selecting the appropriate one from internet is not very easy job for undergraduate medical students.

The present interventional study was designed to identify the better way of continuing education of Anatomy in special situation where students were detached from one institute for a shorter period (about 2 months) of time. The perception of a group of exposed students expressed on a self-administered questionnaire about the utility of the online aids presented to them from the department of Anatomy using internet and other aids available on internet.

Materials and Method

All the second year students of a private medical colleges in Bangladesh went on leave on 07 July, 2024 for an indefinite period. The Anatomy department of the studied medical college requested all the students to remain connected to a mobile application platform ('Telegram'). The mobile application was created at the beginning of the course of that batch to maintain continuous contact. So, the students were well acquainted with the group activities. Students of that batch were in the initial part of Term III course of phase I. They were informed about their schedule and duration of the term. As per the schedule recorded classes were prepared using PowerPoint slides in 'MPEG-4 video' format playable by any software. The recorded classes were uploaded to a YouTube channel and links were shared in group gradually maintaining sequence of class schedule. Doubts of students were cleared individually or in group, if raised. Time to time students were motivated for self or group study and to remain updated, so that they could complete the practical part easily on appearance to the college. A few 'PDF of text and on practical aspects' were uploaded to aid the learning process. The students returned to the college after about 2 months.

A questionnaire was prepared in the line of objectives of the study from literature review. No validated instrument was observed that

matched with the objective of the study. On appearance of the students at college one week time was allowed to understand the effect of intervention and instrument (questionnaire) was applied to collect data. Total 126 students were in the class and questionnaire was distributed. A short brief on the nature and purpose of the study was expressed to the students. The students requested time to fill up the questionnaire as there were two open-ended questions. They were allowed to take the questionnaire with them and to return that with answers. The questionnaires were collected from the students on the subsequent day, who voluntarily returned those. Quantitative data were analyzed using excel sheet and SPSS 19. Qualitative findings were compiled on Microsoft text file and are presented in the form of verbatim here in result which are felt to be relevant.

Result

Total 86 (68.25%) responses were received and one response was not included in the study as it was not properly filled. Among the respondents 47 (55.3%) were Bangladeshi students and 38 (44.7%) were foreign students. All participants were members of academic 'Telegram group' of the department and were aware of 'uploaded local made recorded classes on different topic as per their curriculum'.

The students' responses regarding the online resources are shown in the Tables I and II. All Bangladeshi students viewed that recorded classes of Anatomy department, PDF documents of Anatomy department, YouTube lectures and online anatomical images were useful. Live classes on Zoom were identified as waste of time or not tried by 13.3% Bangladeshi students. They respectively 31.9%, 36.1% and 45.7% did not have any interest in handouts, books and PowerPoint slides available online (Table I).

All Foreign students viewed that recorded classes of Anatomy department were useful. Live classes on Zoom were identified as wastage of time or not tried by 10.5% foreign students. Respectively 13.1%, 13.5%,18.4% and 18.4% of the foreign students showed no interest in YouTube lectures, online handouts, books and PowerPoint slides available online (Table II).

Bangladeshi students expressed strong views (92%) in favour of usefulness of recorded classes translated in Bangla. Bangladeshi students rated 'recorded classes of Anatomy department' significantly (p=0.04) higher than that of foreign students. On the other hand, foreign students

Table-I

Distribution of Bangladeshi respondents as per their views regarding online resources (n=47)

Ser	Online resources	Excellent Score=4 f (%)	Very useful Score=3 f (%)	Useful Score=2 f (%)	Wastage of time Score=1 f (%)	Not tried f (%)
1	Recorded classes of Anatomy department	27 (57.5)	19 (40.4)	1 (2.1)	0	0
2	Live Zoom classes (n=45)	08 (17.8)	13 (28.9)	18 (40.0)	04 (08.9)	02 (04.4)
3	PDF of Anatomy department	24 (51.1)	18 (38.3)	5 (10.6)	0	0
4	YouTube lectures	24 (51.1)	12 (25.5)	11 (23.4)	0	0
5	Animations available at YouTube (n=46)	27 (58.7)	14 (30.4)	04 (08.7)	01 (02.2)	0
6	Online anatomical images	31 (66.0)	09 (19.1)	04 (08.5)	0	03 (06.4)
7	Online handouts	10 (21.3)	18 (38.3)	04 (08.5)	01 (02.1)	14 (29.8)
8	Online soft books	03 (06.4)	12 (25.5)	15 (31.9)	01 (02.1)	16 (34.0)
9	Online PPT slides (n=46)	06 (13.0)	14 (30.4)	05 (10.9)	01 (02.2)	20 (43.5)

Table-II

Distribution of the Foreign respondents as per their views regarding online resources (n=38)

Ser	Online resources	Excellent score =4 f (%)	Very useful score =3 f (%)	Useful score =2 f (%)	Wastage of time score =1 f (%)	Not tried f (%)
1	Recorded classes of Anatomy department	14 (36.8)	21 (55.3)	03 (7.9)	0	0
2	Live Zoom classes	09 (23.7)	17 (44.7)	08 (21.1)	03 (07.9)	01 (02.6)
3	PDF of Anatomy department (n=37)	19 (51.4)	09 (24.3)	08 (21.6)	0	01 (02.7)
4	YouTube lectures	13 (34.2)	13 (34.2)	07 (18.4)	01 (02.6)	04 (10.5)
5	Animations available at YouTube	17 (44.7)	11 (28.9)	9 (23.7)	0	01 (02.6)
6	Online anatomical images (n=36)	25 (65.8)	06 (15.8)	02 (05.6)	01 (02.7)	02 (05.6)
7	Online handouts (n=37)	10 (27.0)	15 (40.5)	07 (18.9)	02 (05.4)	03 (08.1)
8	Online soft books	12 (31.6)	13 (34.2)	6 (15.8)	01 (02.6)	06 (15.8)
9	Online PPT slides	15 (39.5)	14 (36.8)	02 (05.3)	01 (02.6)	06 (15.8)

Table-III

Comparison of Bangladeshi and Foreign respondents as per their views regarding online resources (df = 83)

Ser	Online resources	Bangladeshi Mean ± SD	Foreign Mean ± SD	p
1	Recorded classes of Anatomy department	3.55 ± 0.54	3.29 ± 0.61	0.04 *
2	Live Zoom classes (df=81)	2.58 ± 0.91	2.86 ± 0.89	0.16
3	PDF of Anatomy department (df=82)	3.40 ± 0.68	3.31 ± 0.82	0.55
4	YouTube lectures	3.28 ± 0.83	3.12 ± 0.84	0.40
5	Animations available at YouTube (df=81)	3.46 ± 0.75	3.22 ± 0.82	0.17
6	Online anatomical images (df=82)	3.64 ± 0.69	3.62 ± 0.74	0.91
7	Online handouts (df=82)	3.12 ± 0.74	2.97 ± 0.87	0.45
8	Online soft books	2.55 ± 0.74	3.13 ± 0.83	0.005 *
9	Online PPT slides (df=81)	2.96 ± 0.77	3.34 ± 0.75	0.06

Note: * Differences are statistically significant.

rated 'online soft book' significantly (p=0.04) higher than that of Bangladeshi students as learning aid. Both Bangladeshi (p=0.000) and foreign (p=0003) students rated 'live Zoom classes of the department' as least effective. The mean scores indicate that both Bangladeshi and foreign students think 'recorded classes of Anatomy department' were close to excellent aid and 'live Zoom classes' were between very useful and useful grades. Most of the students appreciated that the videos were very through, elaborate, understandable and important areas were emphasized. Some relevant verbatim are presented in Table VI.

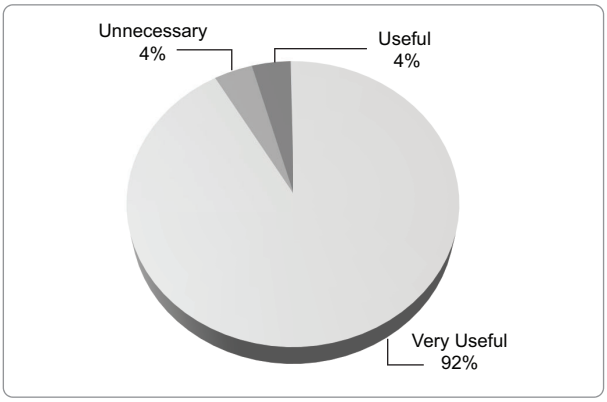

Figure 1: *Distribution of Bangladeshi students as per their views regarding translated Bangla recorded class (n=47)*

Table IV

Comparison of ratings of various resources given by Bangladeshi students (n=47)

Ser	Online resources	Bangladeshi Mean ± SD	f	p
1	Recorded classes of Anatomy department	3.55 ± 0.54	12.17	0.00
2	Live Zoom classes (n=45)	2.58 ± 0.91		
3	PDF of Anatomy department	3.40 ± 0.68		
4	YouTube lectures	3.28 ± 0.83		
5	Animations available at YouTube (n=46)	3.46 ± 0.75		
6	Online anatomical images	3.64 ± 0.69		

Table-V

Comparison of ratings of various resources given by Foreign students (n=38)

Ser	Online resources	Foreign Mean ± SD	f	p
1	Recorded classes of Anatomy department	3.29 ± 0.61	3.6692	0.003
2	Live Zoom classes	2.86 ± 0.89		
3	PDF of Anatomy department (n=37)	3.31 ± 0.82		
4	YouTube lectures	3.12 ± 0.84		
5	Animations available at YouTube	3.22 ± 0.82		
6	Online anatomical images (n=36)	3.62 ± 0.74		

Table-VI

Some relevant verbatim observed as answer to the open ended questions

Question: Please comment on the quality of the 'Recorded classes of Anatomy department'

Quotes: Videos are of average quality

- Videos are good and useful. But quality could have been better.
- Those were very through, elaborate and understandable. Important areas are emphasized.
- Those were very useful, informative and clearly discussed.
- Please upload all the classes in the schedule.
- Voice and video quality not good, some words skip between slides transition.

Question: Please comment on the training effort taken by the department and the online aids with your suggestions that can be helpful during special situation.

Quotes:

- During special situation only because of the efforts taken by the department we didn't get off track from the studies.
- Please upload some oral and OSPE related videos. Videos on viscera and models.
- Regularly upload some hard topics in Bangla.
- We face technical problem during Zoom class. But recorded classes are really helpful.
- Extremely useful. Continue to upload the sides of class.
- Dissection videos on the real body dissection will also be appreciated.

Discussion

Curricular overload in medical education is a global problem and demands continuous and effective utilization of available time[8]. The medical education of Bangladesh is still struggling to come out of the session overload situation and lagging behind the schedule after the COVID pandemic. This challenge often becoming unbearable because of unscheduled loss of academic hours. Various academic online innovations have shown some light to face the challenge[9].

The present study was planned to face the challenge of unexpected loss of academic hours as well as to observe the effectivity of the academic innovations. The videos on Anatomy topics of term III were made by the teacher at home condition using a laptop without any special recording device. The study revealed that those videos scored 3.55 (mean) out of 4 (95% CI, 3.40 - 3.70) by Bangladeshi students and 3.29 (mean) out of 4 (95% CI, 3.10 - 3.48) by foreign students. The scores were significantly more than scores of live Zoom classes (p=0.00). The scores were better than those of existing lectures present at the YouTube though not statistically significant.

In teaching Anatomy, laboratory teaching and face to face demonstrations are always preferred. Study also showed no added influence of the provision of more online resources in Anatomy as viewed by the students as well as on learning outcomes[10]. A study was designed on occupational therapy students who used a gross Anatomy laboratory versus online anatomy software (Anatomy TV) as tools to learn Anatomy at a large public university and a satellite campus in the Midwestern United States. The objective of the study was to compare learning outcomes as per the learning strategy used[11]. The outcomes were students' grades, self-perceived learning and satisfaction. At the end of the course, the gross anatomy laboratory group had significantly higher grade, self-perceived learning and satisfaction than the Anatomy TV group. Simultaneous exposure to virtual laboratory followed by face to face small group teaching session showed significant positive effect in learning anatomy[12].

During COVID situation ideas of online alternatives to the Anatomy laboratory got the importance and innovative ideas came into being. The learning community that was existing within physical Anatomy practical needed to be shift online. Researcher tried to develop virtual replacement of visuo-spatial and social elements to maintain students' engagement and enhance learning in webinars[13].

A systematic review was conducted by Papa V et al[14] to investigate whether or not anatomical educators were able to deliver anatomical knowledge during COVID pandemic. The search strategy was conducted between July 2020 to July 2021. The possibility of advent of new technologies in overcoming of dissection as the main instrument in anatomical education. Two hundred and one records were identified and a total of 79 studies were finally included. From the analyzed records it appeared to the author that both from students' perspective as well as teachers' there was a clear gap between those who endorse dissection and those who believe it could be easily overcome or at least integrated by virtual reality and online learning. The authors strongly believe that the best Anatomy teaching practice requires the careful adaptation of resources and methods. They supported cadaveric dissection and hope that it will not be replaced entirely as a result of any special situation like COVID pandemic[14].

In this study, the students appreciated the recorded classes and opined that those helped them in learning during absence from class as well as those classes are helpful during normal course period. They suggested to upload the recorded classes simultaneously with the course period and keep them in YouTube. They claimed that these clarify difficult areas. Almost all (92%) Bangladeshi students opined that recorded classes translated in Bangla were very useful. On the other hand, 02% of them felt that the effort was useless. In a study in Bangladesh on third year students Hossain S et al observed that the undergraduate medical students were facing varying but noticeable amounts of difficulty with most of the areas of

'English used in Anatomy'[15]. Not only in Bangladesh, courses presented in second language is identified as potential barrier to students' academic learning worldwide and is one of the most important barriers to students' academic success[16,17].

Conclusion

Transformation of Anatomy teaching towards technology based strategy is always disputed and consensus of the educators incline towards the laboratory based face to face teaching. This study revealed that online strategy can be an adjuvant to the main strategy of Anatomy teaching and learning as well as language barrier of the students need to be addressed.

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